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School Uses of the Central Program-Distribution System

R. R. LOWDERMILK

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BUREAU OF EDUCATIONAL RESEARCH

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Foreword

It is obvious that problems associated with the selection and use of equipment continuously confront those who attempt to make use of radio programs, recordings, or public-address apparatus in the school. The startling growth in recent years in the number of school buildings equipped with centralized radio-sound systems is evidence of the recognition on the part of schools of the usefulness and flexibility of such apparatus. It is difficult, however, for the educator to secure such help in the selection and use of this equipment from existing printed materials. Descriptions of typical school uses are widely scattered in a variety of educational periodicals. Technical matters are usually dealt with in bulletins or monographs which are too difficult for the casual educational reader. Even when they are understandable, they are not always useful because the material is treated without proper regard for the educational functions the equipment is intended to serve.

This pamphlet represents a marked contribution to the literature in the field of radio sound equipment. It is written primarily in terms of the educational uses to which such equipment may be put, and it treats of technical matters in relation to such uses and in a fashion sufficiently simple for the average teacher or administrator to understand. It attempts to deal with the topics which most often puzzle the educator; namely, the specific functions of a central program-distribution system, the relation of in-school broadcasting by students to the general educational program, and the administrative and supervisory problems involved in the effective utilization of such equipment for both program distribution and for in-school broadcasting.

An early draft of this material was submitted to equipment manufacturers, radio engineers, and school officials who have made use of such equipment. Their helpful suggestions and criticisms have been faithfully embodied in the final draft. Much appreciation is due to these individuals who devoted a good deal of time to a critical reading of the original manuscript.

Classroom teachers, supervisors, principals, and superintendents should find this pamphlet extremely useful as they develop a program of audio aids for their schools. It will be of assistance both in planning new equipment and in making more effective use of present apparatus. It should help manufacturers, engineers, and salesmen of program-distribution equipment to understand more clearly the specific services which this type of equipment will be expected to provide.

The Evaluation of School Broadcasts project at Ohio State University is issuing this pamphlet in the belief that it will meet a great need in the field of radio education. The manifold ways in which audio aids are being incorporated into education are profoundly influenced by the type of equipment available. Proper selection and use of equipment is basic to any program of audio education within the school.

I. KEITH TYLER

Columbus, Ohio
May, 1941

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School Uses of the Central Program-Distribution System

It is generally conceded, today, that the use of radio in the schools has been accorded general acceptance by teachers, school officials, and the public, alike. It requires relatively little imagination, in fact, to understand that classroom utilization of radio programs offers a convenient means for bringing the actualities of contemporary life into the educational program of the school, and for extending the opportunities for students to become widely familiar with the cultural achievements of present-day society. Many teachers have been alert to these potential values of radio since the very beginning of broadcasting. It would be a mistake, however, to assume that the use of radio in the schools is concerned only with receiving radio broadcasts from the air and distributing them to listening class groups.

The early commercially built radio receiving sets were so expensive that relatively few schools could afford them. Moreover, these early sets were usually too bulky to be moved about from one classroom to another. Hence, when the central program-distribution system first made its appearance on the market, many schools turned to it as a means of providing dependable broadcast-listening facilities in all classrooms more economically than would have been possible through the use of a separate receiving set in each classroom.

Yet, despite the fact that, with mass production, the costs of ordinary radio receiving sets have steadily declined, the central program-distribution system is steadily gaining popularity with schools. The explanation for this is, of course, that

EDITOR'S NOTE: The central program-distribution system is variously referred to as a "radio-sound system," a "central sound system," or a "school public-address (P.A.) system." The name "central program-distribution system" most nearly indicates its general type of services.

teachers and school administrators have found that the central program-distribution system is readily adaptable to a wide variety of educational and administrative functions within the school, in addition to providing dependable reception of radio broadcasts. Certain of these functions have become so much a part of the teaching and administrative routine of schools equipped with central program-distribution systems that they tend, more or less, to set the pattern for general practice.

This bulletin is intended to serve three purposes: First, in calling attention to the more common uses that are being made of centralized radio equipment, it may help schools now contemplating the purchase of new equipment to decide whether to choose a central program-distribution system, or to choose separate receiving sets for their several classrooms. Second, it may suggest to schools certain potential uses of the equipment which are frequently overlooked. Finally, in describing simple techniques for regularizing the use of central program-distribution systems, it may help schools to overcome certain difficulties which may have prevented them from actually using their present equipment for some of the educational and administrative purposes which it was intended to serve.

Part I lists, in summary form, the more common uses which schools having centralized equipment have reported, and gives a brief descriptive characterization of each use. Part II calls attention to several questions for administrative consideration. Part III provides a somewhat more detailed treatment of a type of use which seems to be receiving a major emphasis in an increasing number of schools, namely, student broadcasting to class groups within the school. Finally, Part IV suggests a plan for distributing the respective responsibilities for carrying out each of the several kinds of activities involved in student broadcasting in a manner calculated to provide for the maximum utilization of faculty and student resources.

PART I

Commonly Reported Uses

RECEPTION OF RADIO BROADCASTS FOR CLASSROOM LISTENING

The feeling seems to be rather general, among both teachers and school administrators, that the primary function of the central program-distribution system is that of receiving radio broadcasts from the air for school listening, even though its use for this purpose may consume but a fraction of the total amount of time it is used each day. If schools were interested solely in this one aspect of education by radio, the central program-distribution system could hardly claim any unique advantage over a properly installed radio receiving set of comparable performance quality, except that there would be no need to move either the receiving instrument or class groups. In fact, some schools actually prefer individual classroom receiving sets to centralized equipment, claiming that a receiving set in each classroom enables any teacher to tune in any broadcast she may desire, at any given time, regardless of which broadcasts other classes may be listening to at that time.

While it must be conceded, in all fairness, that this is indeed a valid argument in favor of the use of individual classroom receiving sets, there can be no denying that broadcast reception is more consistently satisfactory with the central program-distribution system than it is where classroom receiving sets are used. All too frequently, individual receiving sets, being moved about from one classroom to another as they are, are operated without suitable antenna and ground connections, or, perhaps, with none at all. Under conditions of this kind, reception is often noisy. Line hum and man-made static, picked up by the electrical wiring of the building from various power-driven appliances, may also enter the receiving set through the electrical outlet into which the set is plugged. On the other hand, any company specializing in school program-distribution equipment must, of necessity, guarantee its satisfactory performance, and, in consequence, provides, with each installation, an efficient antenna and ground system, together with a noise-filtered electric-current supply. Hence, conditions which tend to result in noisy broadcast reception are usually corrected when the program-distribution system is installed.

From the standpoint of consistently satisfactory radio-broadcast reception, the central program-distribution system offers yet another advantage over the classroom receiving set. Relatively few of the portable receiving sets selling within the price range at which schools usually buy are capable of the same precision of tuning which the program-receiving unit in the central program-distribution system offers. When, to this difficulty is added the further difficulty—an all-too-common characteristic of teachers as well as laymen—of being unable to tune in stations accurately, it is not surprising that faulty reception of broadcasts over classroom receiving sets has become an almost universal complaint.

DELAYED RADIO BROADCAST LISTENING

Many schools have experienced difficulty in trying to rearrange class schedules to permit the several sections of a given class group to hear some much-desired radio broadcast. Any school whose radio-sound equipment includes a sound-recording machine can record broadcasts directly from the air, and can play back these recorded programs, over either the central program-distribution system or a separate portable transcription reproducer, at whatever time seems most convenient for each class to listen.

Where this practice is followed, it is probably advisable to "cut in" the school microphone, immediately after the station sign-off of each broadcast recorded from the air, and finish off the recording with some such announcement as the following:

> This is an off-the-air recording made expressly for experimental use within the (name of city) School System, and may not, under any circumstances, be given away, sold, or used for any commercial purpose.

REPRODUCTION OF RECORDED MATERIALS

Schools were already using phonograph records before the advent of radio broadcasting. Even after radio became a commonplace in the schools, phonograph records continued to be used. Now that improvements in record materials and recording processes, together with refinements in record-playing equipment, have increased the naturalness of phonographically reproduced sound, the use of recorded materials is finding an even wider acceptance by schools. Standard phono-

graph records continue to bring the music of great artists to boys and girls through the use of the electric phonograph, the portable transcription reproducer, and the central program-distribution system, while some schools even provide "luncheon concerts" in their student cafeterias by playing popular and light classical records over their central sound systems.

More recently, recordings of significant radio broadcasts and recordings produced specifically for supplementing teaching have been made available to schools. Recordings of this type are usually produced in the 16-inch size, and must be played at a speed of 33⅓ revolutions per minute (r.p.m.), providing fifteen minutes of program on each of the two sides of a disc. It is only within the past few years that manufacturers of program-distribution equipment have been incorporating provisions for playing these large-size discs, but a dual-speed, 16-inch turntable and special lightweight pickup for playing these recordings can be substituted for the phonograph unit of conventional type with which these older installations were provided, at a cost of about $50 to $75.

ADMINISTRATIVE USES

1. Intercommunication between office and selected classrooms.—Many of the central program-distribution systems which have been installed within the past six years incorporate, in their design, a feature known as the "return-speech" or "classroom talk-back" feature. This device enables the person operating the central control cabinet to carry on a two-way conversation, over the loud-speaker system, with any classroom teacher, or to ask questions of any class group and to hear the replies over the loud-speaker located in the control cabinet.

Wide differences of opinion are found among schools as to the value of the return-speech feature. There are instances in which the teachers, probably because of a lack of complete confidence in the school administrator, have resented the use of the return-speech feature, fearing that their work was being judged solely on the basis of what the school administrator heard when "listening in" on their classes. In other schools, teachers and school administrators, alike, just as strongly praise the return-speech feature because of the time and extra steps that it saves. Obviously, it is much more convenient to discuss some matter of immediate importance with a classroom teacher,

over the return-speech system, than it would be either for the administrator to make a trip to the classroom and back, or for the teacher to leave her classroom and come to the office. Hence, it would seem that mistrust of the return-speech device by teachers should probably be regarded as a symptom of unsatisfactory personnel relations rather than as a criticism of this device in itself.

It might be pointed out, however, that the school administrator needs to exercise some discretion in using the return-speech system, lest the very convenience which its use provides lead him, unconsciously, into the all-too-prevalent fault of continually interrupting classroom routine with notices and questions which might just as easily be grouped into one or two general announcement periods during the school day.

2. Administrative announcements.—Every school administrator is fully aware of the vast number of routine details which need to be discussed with his teaching staff and with the student body. Because of the considerable amount of time involved in assembling the student body, or, for that matter, even the teaching staff, school administrators have commonly followed the practice of sending special notices and bulletins around to the various classrooms. This has never been entirely satisfactory, however. A notice delivered to a teacher in the middle of a class session can easily become lost in a pack of papers, and not be discovered until a week later, when the special event it announced has become history. In contrast, the program-distribution system enables the school administrator to speak before the entire student body at either the beginning or the end of a class session, or at a regularly scheduled announcement period. In similar fashion, he can call any teacher, or group of teachers, and discuss routine matters with them, using the return-speech feature.

Practices in handling announcements differ from school to school. Many schools schedule a regular announcement period each day, at which time all announcements, either by faculty members or by students, are made for the day. Others schedule both a morning and an afternoon announcement period, while still others may schedule but one or two announcement periods a week. Few schools that have used program-distribution systems over any considerable length of time, however, allow administrative announcements to interrupt the students' work

during class periods. While emergency situations may arise, occasionally, in which the interruption of classroom routine can be justified in terms of the common good, repeated interruptions of this kind are commonly frowned upon as poor educational practice.

3. Cultivation of school spirit.—Many school administrators have found that the program-distribution system can be used to advantage in building school spirit. "Pep talks" by members of the faculty may be broadcast as a means of arousing interest in a forthcoming game, or as a means of organizing student support behind some important change in school policy. A teacher-student panel may discuss some problem in which the students generally are interested. Similarly, panel groups made up of representatives of the various student clubs and class groups may be invited to broadcast critical appraisals of some detail of school management. Administrators who have used the program-distribution system long enough to become familiar with its potentialities will probably be able to suggest still other kinds of broadcasts of the personnel-relations type. The real significance of this type of use lies in the fact that such broadcasts tend to erase the barriers of tradition, which, in the past, have so often had the effect of dividing students and faculty into opposing camps, with the result that the entire school becomes something of a closely knit, self-contained community wherein problems of instruction, guidance, and management become common concerns to be resolved through co-operative action.

BROADCASTING BY STUDENTS

In schools equipped with program-distribution systems, broadcasting by students has become so general that its "educational respectability" is no longer questioned. In fact, this use has even tended to overshadow other uses in a great many schools. In view of the almost universal interest in this use of the program-distribution system, it has seemed advisable to devote a separate section of this pamphlet to a somewhat more detailed treatment of the topic of broadcasting by students.

PART II

Some Administrative Considerations

REASONS FOR FREQUENTLY NEGLECTED USES

It would be a mistake to infer that every school which has a central program-distribution system is using it in all of the ways which have been suggested in the preceding sections. Although the general pattern of uses which schools make of this type of equipment probably includes most of those which have been described, it is not difficult to find instances where the central sound system is used for little else than making administrative announcements and for tuning-in occasional broadcasts. Where this condition exists, it can usually be explained in terms of one or more of the five following causes.

1. Inappropriately designed equipment.—In the past, many schools have been unable to make any wide use of their program-distribution systems because their equipment was inappropriately designed for the uses expected of it. Even today, it is not uncommon for the person responsible for selecting the central system to make his choice on some such basis as price difference, general appearance of the cabinet, or the pleasing personality of the salesman, instead of considering whether or not the equipment is readily adaptable to the specific educational and administrative functions it will be expected to serve. Fortunately, manufacturers who have specialized in this type of equipment have come to anticipate some of the uses which schools expect program-distribution systems to accomplish, and are now designing their systems accordingly. The only way, however, in which a given administrator can be sure that the program-distribution system he orders will fit the specific needs of his schools is for him to specify, at the time the contract for the installation is made, the particular services it will be expected to perform, together with the operational characteristics and performance quality which these services will require. The school administrator should bear in mind the fact that, while it is always possible to redesign certain portions of a program-distribution system or to add auxiliary equipment so that it will perform some function that was originally overlooked, such alterations are usually far more costly than having them built in when the system is installed.

2. Careless or faulty operation.—It is rather common to find that a school fails to accomplish all the educational and administrative applications for which its program-distribution system was designed because the persons who are made responsible for operating it either lack the relatively little mechanical facility which is needed, or are unable to understand the manual of instructions which explains its operation. There should be no excuse for careless or faulty operation in view of the fact that the dealer or distributor who makes a school program-distribution installation invariably makes an honest effort to familiarize some person in the school with its operation. The precise difficulty was summed up rather aptly by a public-address equipment dealer, in explaining why he had discontinued his line of program-distribution systems for schools, as follows:

> Of course we make an effort to teach them (the school personnel) how to use the equipment! We want the installation to live up to the claims we make for it, don't we? . . . When we get around to the question of training somebody to operate it, it's usually the principal who wants to be shown how to do it. . . . Then, what happens? He "hogs the microphone" or works the return-speech feature to death for a month or so, till the novelty wears off, and then he turns the job over to somebody else to do. Meanwhile, the instruction book has got buried somewhere in the office files, or burned up with last month's examination papers. Somebody twists off a couple of knobs, trying to force them in the wrong direction, manages to get a dead short somewhere, and blows a tube! . . . Is the school ever at fault? No! It's always the equipment! I've seen it happen again and again!

Perhaps the best advice that can be offered to a school administrator, by way of avoiding difficulties of this kind, is to delegate the chief responsibility for operating the program-distribution system and its accessory equipment, at the outset, to some individual who seems naturally to be interested in working with mechanical and electrical devices. He should then insist, first, that this person familiarize himself thoroughly with every aspect of the operation and maintenance of the system, and, second, that he train additional operators to handle the equipment at such times as he may be unable to do so.

3. Improper location of the control cabinet.—Any wide use of the program-distribution system is impossible, in many schools, because of the fact that the central control cabinet is located

in the principal's office, where, often, it cannot be used without interrupting conferences or interfering with administrative routine. Although there seems to be a tendency for a principal to want the central control cabinet in his office, where it can be kept locked, safe from inquisitive (or acquisitive) fingers when not in use, it must be pointed out that the school principal has more important duties to perform than handling such routine details as tuning in radio programs and switching them into the classrooms which are to use them, doing interroom paging, and turning on the microphone for student broadcast rehearsals. Routine duties such as these are much more appropriately handled by the principal's secretary, or, if no secretary is available, teachers and selected students can be given the necessary training, and then assigned by turns to operate the control cabinet.

Where the control cabinet is already located in the principal's office, the school might as well accept the fact that it would be inadvisable to undertake any elaborate program of student broadcasting, unless it is practicable either to relocate the principal's office or to move the control cabinet to some other place in the school.

4. A negative attitude on the part of teachers.—In some instances school administrators have complained that their teachers "just didn't seem to be interested in using the program-distribution system, except for receiving radio broadcasts for classroom listening." Since the educational values of the various activities associated with student broadcasting are so widely conceded, it seems highly improbable that the teaching staff of any school today could be wholly indifferent to the potential uses of program distribution beyond that of radio-broadcast reception. A more likely explanation for such seeming indifference is that teachers may hesitate to take the initiative in beginning student-activity broadcasting because of the belief that they know too little of the necessary techniques to risk the venture.

Where this situation is encountered, it may be advisable to suggest an exploration of the potential uses of the system as an in-service training project for the entire faculty. A variety of excellent articles describing the various uses of program-distribution equipment, together with explanations of procedures followed in accomplishing them, have appeared in

educational and technical magazines and in published reports dealing with the uses of radio in education. Materials of this kind can usually be found in any college library or in the public library of any city of considerable size. Other materials of similar nature are often found in the sales literature of manufacturers of this type of equipment. Equipment salesmen are often able to suggest new and interesting uses, and explain how they are accomplished in other schools. Local radio dealers and servicemen may be able to explain operating techniques which will make new uses possible, or to point out some simple and inexpensive changes which will provide for some much-desired use. The engineer of a local radio station may be able to offer helpful suggestions as to details of construction and characteristics of operation which should be considered in planning either a new installation or the modernization of an existing system.

Any school which has a program-distribution system would do well to build up a library of materials dealing with such topics as general uses of equipment of this type, techniques of script-writing, casting, program-production, and the like. A number of books dealing with these topics will be found listed in the catalogues of the various publishing companies. Other materials, including bibliographies, are available from the United States Office of Education. Finally, it should be pointed out that a number of teacher-training institutions are now offering summer courses dealing with radio-program production and with the general use of radio in education, many of which provide an opportunity to get firsthand experience in planning and producing student broadcasts.

5. A negative attitude on the part of the school administrator.—A few instances have been found in which the failure to realize the potential values to be gained from a wide use of the program-distribution system appeared to be attributable to the principal's having discouraged any use of the system by teachers and students. In defense of the school principal, it should be pointed out that, among the various responsibilities of his office, he is the technical custodian of all school property. Hence he is expected to exercise due care in protecting equipment against all hazard beyond that which may reasonably be expected to result from normal use. While the actual custodianship of most types of school property is customarily

delegated to others, the program-distribution system is likely to come in for a more-than-ordinary amount of vigilance on the part of the principal. Of all school equipment, it is probably the most easily damaged by incorrect manipulation. Then, too, the school principal is likely to feel an even greater responsibility for the care of the program-distribution system because of the fact that it tends to be invested with a certain amount of glamour in the popular imagination of the school community. In consequence, the principal may become unnecessarily cautious about allowing persons other than himself to operate the system, unwittingly giving his teachers the impression that they are not welcome to use it. Since any such doubts of the sincerity of the principal's motives may, in time, come to weaken the morale of the teaching staff, the safest course for the principal to follow will probably be to take immediate steps toward setting up a co-operative arrangement for determining the uses to be made of the system, instead of waiting for evidences of teacher dissatisfaction to manifest themselves.

This complaint merits still further consideration because of the fact that it raises a fundamental question of school policy. On what basis shall the specific uses to be made of the school program-distribution system be determined? Is it enough for the principal to share this responsibility with his faculty, or should the student body have a voice in determining the uses to be made of the system?

Modern education holds generally to the belief that the school should be a self-contained community in which individual abilities and understandings are brought to bear, through the application of democratic processes, on problems of common concern and interest. This conception of the school presupposes that students will have access to such media of communication as will facilitate the interchange of ideas and the comparison of experiences. So far as individual classroom groups are concerned, this need has been met reasonably well through group discussion, in which students and teacher may participate freely. Yet the need of the school as a whole for a convenient medium of communication has been met only imperfectly by such conventional devices as the school assembly, the school paper, and the like. In consequence, any well-defined community spirit encompassing the school as a whole has been notably lacking, except for those times when the emotional support of the

student body is mobilized by the familiar techniques of the "pep" meeting.

There seems to be a growing belief, among the teachers and administrators of radio-equipped schools, that the use of a central program-distribution system may make it possible for schools to realize this schoolwide community ideal. In support of this point of view, it might be pointed out that the school program-distribution system, like radio broadcasting, is a device for accomplishing instantaneous mass communication. True, there are some obvious differences. The program-distribution system sends out its program signals over wires instead of broadcasting them through space, and its programs are heard over classroom loud-speakers rather than over home receiving sets. The end result, however, is essentially the same in either instance. The speaker at the microphone is able instantly to reach a much larger audience than it would be either practicable or convenient to assemble into a single group. It is generally conceded that radio broadcasting has tended to bring the various sections of the United States much closer together with respect to a general recognition of common problems and concerns, and the reorganization of regional cultures into something approaching a national culture. It should be pointed out, however, that radio broadcasting might have had somewhat different social consequences had federal regulations not prevented it from coming under the control of any single small, self-perpetuating group of individuals who might have sought to use it for selfish purposes rather than for the good of society. On the assumption that radio broadcasting, in a democratic society, should serve as a clearinghouse for public opinion, the code of the radio industry provides, further, that any broadcaster who permits a recognized spokesman for one side of any given public issue to broadcast his point of view must provide equal opportunities for spokesmen for other sides of that issue to present their viewpoints. It would seem reasonable to assume, then, that if the central program-distribution system is ever to provide the school with a medium of communication which will be comparable to that which radio broadcasting provides for the nation as a whole, its use must be protected with the same kind of guaranties.

It would be grossly unfair to the school principal to imply that the central program-distribution system cannot be made

to serve the actual needs and interests of students if he alone has the responsibility for determining the specific uses to be made of it. There is little question but that plenty of instances could be cited to refute any such claim. Nevertheless, there is no escaping the fact that complete control of the central system by the school principal would have certain characteristics in common with the politically dominated systems of broadcasting abroad. There would be no choice but to listen whenever "the leader" might choose to speak, and any opportunity to participate, either in broadcasting, or in planning program policies and content, would become a specially conferred privilege rather than a popularly owned right. Joint control by the principal and his faculty is open to criticism on much the same grounds. Even the most careful planning of services, under either one of these two types of management, would represent, at best, an attempt to plan uses of the system in terms of what adults judge the needs and interests of students to be. Present-day teachers and administrators are looking, more and more, to students themselves for aid in the determination of student interests.

It has already been pointed out that there is general agreement that the school should provide a community setting in which students can share in the satisfactions of exploring common interests, and can pool their resources in solving problems of common concern. It has been pointed out, further, that students must have access to some central instrumentality for mass communication before there can be any clear-cut recognition that they actually have concerns and interests which are common to the group as a whole. It seems reasonable to believe that the central program-distribution system offers a practicable solution to the problem of providing the school with such an instrumentality. If, however, the program-distribution system is to make any significant contribution in this direction, students and faculty members, alike, must be able to identify their respective needs and interests in the uses that are made of it, and, in addition, they must have full confidence that all considered opinions on any issue of common concern will find equal opportunity for expression. This implies, of course, that the actual management of the uses that are made of the system in any given school, will, ideally, be shared among the administrator, the faculty, and the student

body, alike. Here, then, is a challenge which any school principal should welcome, since it offers a real opportunity to make the most of his administrative insights and organizing ability. To the extent that he is able to work out an arrangement whereby the student body, his teaching staff, and he, himself, will share equally in determining the uses to be made of the program-distribution system, he will not only be establishing the management of the system on a basis which he can defend in terms of sound educational practice, but he will be providing a framework in which practical democracy can operate.

PROBLEMS OF EQUIPMENT DESIGN AND ARRANGEMENT

In planning either the installation of a new program-distribution system or the modernization of one already in use, the school administrator is often called upon to make decisions relative to equipment design and arrangement about which he knows little. Only too well aware that the adaptability of the system may be materially impaired by his decisions, the administrator is often inclined to approach radio-equipment problems with serious misgivings. Yet, contrary to popular supposition, little more than a general notion of what the program-distribution system is and what it is capable of doing, together with the ability to make a reasonably accurate appraisal of the resources and limitations of the school plant and the faculty personnel, is needed in order to provide an adequate basis for answering such questions.

The central program-distribution system is variously referred to as a "radio-sound system," a "central sound system," a "centralized radio system," or a "school public-address (P. A.) system." Although it is probably better known by the name "central radio-sound system" than by any other, the designation, "central program-distribution system" most nearly defines the general classification of the services it performs.

Without meticulously going into all the details which technical exactness would necessitate, the program-distribution system can be described, simply, as a device for building up (amplifying) the energy of the minute electrical currents which are fed into it by any selected program-originating device, such as a microphone, a radio receiving set, or a phonograph, and then distributing this increased (amplified) energy among any desired combination of output devices. The relationships

among these several functions is illustrated in the diagram given in Figure 1.[1]

For the most part, this diagram should be self-explanatory. The meanings of the various items which it includes will probably become somewhat more clear as references are made to them in the discussion of specific problems of equipment design and arrangement which follows.

An analysis of the most commonly reported complaints which schools make of central program-distribution systems would seem to indicate several problems which are related directly to specific details of either equipment design or to the arrangement and location of its component units. Hence, it

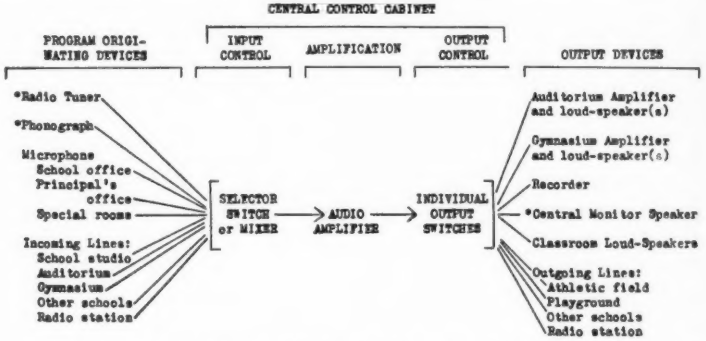

Fig. 1. Relationships of the various functions of the central program-distribution system.

would be well for any school administrator, confronted with the responsibility either for selecting a program-distribution system or for modernizing one already in use, to give careful consideration to each of the following details in relation to the particular problem or problems with which it is associated.

1. Single- versus multi-channel systems. — The program-distribution system which is represented by the diagram in the preceding section is of the single-channel type, since it provides but one program channel, and, in consequence, allows but a single program to be distributed, at any given time, to any desired combination of listening groups. In contrast to

[1] Items marked with an asterisk (*) in the diagram are customarily built into the central control cabinet as a matter of convenience in having all operating controls together.

this type, the multichannel system provides two or more program channels, permitting two or more separate programs to be distributed simultaneously to as many different combinations of listening groups. A few instances have been found where local equipment dealers have characterized single-channel systems having separate return-speech, or "talk-back" circuits as two-channel systems. It should be emphasized, however, that any such characterization is incorrect. A separate return-speech circuit does provide an intercommunication channel which can be used independently of the program channel (or channels, if the system is of the multichannel type), but an intercommunication channel is essentially a device for providing point-to-point communication facilities. As such, it neither offers the same choice of program-originating devices as does a program channel, nor does it provide the same potential coverage of the whole school. Hence, a return-speech circuit cannot properly be classified in the same category as program channels in stating the number of separate program channels which a given program-distribution installation is to provide. Omitting any consideration of the return-speech circuit for the present, then, the school administrator should bear in mind that each program channel is capable of handling only one program at a time, and that, accordingly, if he anticipates any necessity for distributing two or more different programs to two or more different listening groups simultaneously, a multichannel system will be required.

It would be a mistake for the school administrator to assume, however, just because there might happen to be two or three good educational broadcasts on the air at the same time, that his program-distribution system should provide a like number of separate program channels. In the first place, occasions when it might be desirable to distribute more than one radio broadcast to sizable portions of the total school population are probably far less frequent than might be imagined. Even if the number of program channels in any given school might be extended to as many as a half-dozen, there would still always be a possibility that some class group might want to hear a particular broadcast at a time when all six channels were already being used to distribute other programs. It seems fairly certain, then, that a multichannel system, alone, will not guarantee full-time listening facilities for the entire school.

It would seem advisable, then, for any school, regardless of the number of program channels its central system has, to provide one or more portable receiving sets for use by any individual class group which might want a particular broadcast when the central system is already in use for distributing other programs. If one or two portable receiving sets are kept on hand for use whenever any situation of this kind may arise, it seems reasonable to believe that the school of small or even average size will find a single-channel system adequate for handling all the programs (either received from the air, or produced within the school) which are of sufficient general interest to warrant distributing them to the majority of the classrooms.

In the larger schools, however, the number of classroom groups at each of the several maturity or ability levels may be great enough to make it impractical to supply enough portable receiving sets to take care of all groups which might, because of differences in interests and comprehension levels, want to hear different programs at any given time. This might be true, also, in schools in which elementary- and junior–high-school grades or junior– and senior–high-school grades are combined. In such schools, multichannel systems would, of course, offer a wider range of program choice at any single time. This advantage, however, must always be weighed against the disadvantages which arise from the increased complexity of the system as the number of program channels is increased. Each separate program channel requires its own individual amplifier, together with a set of controls for selecting the particular program-originating device to be fed into it at any given time, and for regulating the volume and tone of the programs it carries. In addition, each program channel must have its own individual radio tuner (a device which corresponds to that portion of a radio receiving set which performs the function of selecting the particular broadcast station to be heard at any given time). Finally, each channel will require a separate channel-selecting position on each of the loudspeaker switches. Hence, as the number of program channels is increased, not only will the initial cost and maintenance expenses of the system become correspondingly higher, but the controls required to operate the system will become increasingly complicated. Because of these disadvantages, schools

have seldom found it practicable to provide more than two program channels. It would seem, then, if the choice between a single-channel system and a multichannel system were to be made solely on the basis of providing adequate broadcast-listening facilities, that the single-channel system offers certain obvious advantages over the latter type, except in the larger schools.

The growing interest in student broadcasting over the program-distribution system introduces another factor to be considered in determining the number of program channels to be provided. In many schools, these two functions of the program-distribution system are considered to be of equal importance. The actual amount of time spent in using the central system for rehearsing and broadcasting student programs often exceeds that spent in receiving and broadcasting programs received from the air. In view of the increasing emphasis on this secondary rôle of the program-distribution system, there seems to be some justification for believing that the ideal system, for any school that can afford the additional investment, would be one which provides two program channels. Where budget limitations are such that the problem of selection becomes one of choosing between a high-quality single-channel system and a two-channel system of inferior quality, however, the school administrator will probably do better, in most cases, at least, to choose the single-channel system.

2. The return-speech feature.—The fact that the conventional loud-speaker can be made to operate either as a sound-reproducing device, or as a program-originating device, provides the functional basis on which the return-speech feature operates. The actual process consists of selecting any given classroom loud-speaker, and connecting it, by means of a circuit-reversing switch (the "talk-listen" switch), to the input side of the amplifier, instead of the output side where it is normally connected. In this reversed position, it acts as a microphone, picking up speech and other sounds in the classroom, and "returning" them, through the amplifier, to the loud-speaker in the central office where the control cabinet is located. In its simplest form, the return-speech system utilizes the same amplifier that is used in the program channel. This arrangement, however, makes it necessary to interrupt any

program that is being distributed over the system, if the principal happens to want to carry on a two-way conversation with any classroom teacher at the time. Since program interruptions of this kind are always undesirable, most present-day manufacturers of this kind of equipment have adopted the practice of providing a separate amplifier for return-speech use. This means that if the principal wants to carry on a two-way conversation with any given teacher, at a time when all the classrooms are receiving some program, the loud-speaker in this one classroom is switched from the main program channel to the return-speech amplifier for the conversation, while the program continues in the rest of the classrooms without interruption.

Many people—school administrators, teachers, and the public, alike—have been at a loss to understand why manufacturers continue to include the return-speech feature as a part of the school program-distribution system, in view of the fact that from the beginning it has been more or less the storm center of general controversy. In the beginning, of course, the first manufacturers to include the return-speech feature as standard equipment did so because of the fact that it provided them with an additional "selling point." Others soon followed their example, and the inclusion of this feature became an established practice. The variety of names under which this device has been advertised indicates that there has been no general agreement among manufacturers as to what specific use schools might be expected to make of it. Some called it the "supervisory feature" on the assumption that the school principal might use it as a means for "listening in" on classroom teaching activities. Others called it the "communication feature" (or "communication channel," if a separate amplifier were used) on the assumption that it would be used in much the same way as the conventional office intercommunication system. Still others were careful to use designations such as "return-speech feature" or "classroom talk-back feature," which have reference to the process itself, rather than to any specific function. There has been a similar lack of agreement among school officials as to the appropriate function to be performed by the return-speech feature, but very few school administrators and teachers have been sufficiently familiar with details of equipment construction to realize that this feature might easily be omitted. Consequently, the manufacturers of

program-distribution equipment, hearing no general complaint against the return-speech feature, have assumed that schools want it.

Relatively few schools attempt to use the return-speech feature as a supervisory device at the present time. Teachers, for the most part, have tended to look upon this type of use as a violation of administrative ethics, and have been unwilling to have their work judged on the basis of what the administrator is able to hear over the return-speech system. School administrators, on the other hand, now generally recognize that "absentee supervision" of this kind can, at best, give only a distorted and incomplete picture of what is done in the classrooms. In fact, "listening in" from the school office to class sessions has fallen into such general disrepute among both school administrators and teachers that most manufacturers have abandoned the use of the term "supervisory feature" in referring to the return-speech feature.

The prevailing tendency, at the present time, is to use the return-speech feature for person-to-person communication within the school. It should be pointed out, however, that the return-speech feature is far less appropriate for this type of use than a building telephone system would be. The return-speech feature is a device for use in point-to-point communication. Hence, it does not provide the same privacy in person-to-person communication that the telephone does. Whenever the school principal has occasion to communicate with a classroom teacher, his message is heard by the entire class group, while the teacher's reply can be heard by anybody who happens to be near the central control cabinet. In consequence, use of the return-speech feature for person-to-person communication within the school often wastes more time than it actually saves.

By way of illustration, a hypothetical situation based on an all too common practice might be cited. The principal has been asked to remind Johnnie Smith to stop at the grocery, on his way home from school, and buy a loaf of bread. It would take five minutes to go downstairs to Johnnie's room and deliver this message directly, so the principal uses the return-speech feature instead. This takes only one minute, so four minutes are saved. There are, however, thirty other students besides Johnnie in the class, and, to each of these, this interruption represents a loss of one minute's time. The teacher will probably need at

least another minute to pick up the continuity of the class discussion following the interruption. This brings the actual amount of time that is lost up to a total of one hour! Each minute of the principal's time that was saved cost a quarter-hour of wasted student time.

Incidents of this kind are daily occurrences in many schools. In some, classes may be interrupted in this fashion a dozen or more times in a single school day. It is probably safe to say that most of these interruptions involve two-way communications between two people. Usually, it is either the school principal or the school secretary who is the offender in this respect. The return-speech feature is used to call teachers to the telephone in the office, or to remind them of faculty meetings. It is used to notify individual students of overdue library books, or to relay messages from their parents to them. In some schools, it is used regularly in checking attendance. Whatever the reason, the result is the same. The attention of an entire classroom group is taken from whatever else they may be doing in order that somebody in the school office may either convey a message to one person of the group, or get some item of information from that one person! It has been pointed out that the return-speech feature is a device for providing point-to-point communication rather than person-to-person communication. Hence, any attempt to use it to provide the same kind of service for which a building telephone system would be used cannot be expected to yield wholly satisfactory results.

School administrators and teachers are beginning to recognize the fact that repeated interruptions of class sessions, though of only momentary duration, cannot possibly be justified. Indeed, in a great many schools, there is a definite understanding to the effect that, except in situations of extreme urgency, person-to-person communications over the return-speech system must not interrupt class sessions.

It appears that what the schools really need is a program-distribution system *plus* a building telephone system, rather than a program-distribution system which includes a return-speech channel. Yet it must be admitted that the cost of including a return-speech channel is considerably less than that of providing a separate building telephone system in the school. Where local budget limitations are such that it is impossible to provide a separate telephone system, it is probably advisable

to include a return-speech channel as a substitute, rather than to leave the school without any facilities for person-to-person communication.

In planning a new program-distribution system installation, it would be well for the school administrator to consult a reliable serviceman or equipment dealer about this problem. The cost of providing a separate telephone system can usually be reduced considerably if the wiring for the classroom phones is installed at the same time that the loud-speaker and microphone lines are put in. In some cases, used telephones can be purchased from a local telephone company at relatively little cost. Some manufacturers of program-distribution systems are able to supply classroom telephones which operate as a part of the central system. Others are able to supply a small unit consisting of a phone and a speaker-silencing switch for installing in each classroom. With this device, communications from the central office are not overheard by the class group. Local equipment dealers may be able to suggest still other alternatives.

3. Selecting an appropriate radio tuner.—In planning the installation of a program-distribution system, relatively little thought is ever given to the radio tuner. Yet this is one of the most important parts of the central system if the school expects to use radio broadcasts for class-group listening.

The radio tuner performs the function of separating out, from all the broadcast stations on the air at any given time, the one station whose broadcast is desired. In the ordinary home receiving set, the radio tuner and an amplifier are usually built together as a single unit, usually referred to as the "receiving-set chassis." In the central program-distribution system, however, the radio tuner is usually built as a separate unit. This offers a distinct advantage, since it is possible, without disturbing the rest of the wiring in the control cabinet, to select a radio tuner to suit local radio-reception conditions.

The radio tuners which are furnished as standard equipment with most makes of program-distribution systems are engineered to give satisfactory performance under all normal reception conditions. Schools vary widely with respect to local reception conditions and radio-program interests, however. One school, for example, may have difficulty in receiving the only local station carrying some much-desired series of school broadcasts due to interference from another station which operates on an

adjacent frequency channel. Another school may be unable to use a program series it wants because the nearest station which carries it is too far away to be received clearly at all times. Some schools may want to be able to receive foreign short-wave broadcasts, while others are interested solely in receiving programs that are available on the standard broadcast band. In regions where the new frequency-modulation (F-M) broadcasts are available, schools may want a tuner which will receive these programs, since frequency-modulation transmission is free from most of the static which causes interference in the conventional type of broadcasting. All of these factors need to be taken into account in selecting the radio tuner to be installed in any given program-distribution system.

In preparing the specifications for the installation of any school program-distribution system, then, it is suggested that concrete specifications be included with respect to which stations must be received clearly; whether the ability to separate distant stations is considered to be more important than high-fidelity reception of local stations, or whether the tuner should be able to provide for both; whether or not short-wave reception is desired; and whether or not the tuner should be able to receive frequency-modulation broadcasts.

4. Providing for the use of transcriptions.—Within the past few years a great number of educational recordings have been made available to the school market.[2] Some of these are recordings of outstanding radio broadcasts which have appeared on the air, while others are programs which have been made specifically for classroom use. The fact that the potential value of such recordings, when used to supplement classroom teaching, is now generally conceded needs little elaboration.

Programs of this kind, however, are usually on 16-inch discs, and run at a speed of 33⅓ revolutions per minute, whereas the regular phonograph record does not exceed 12 inches in diameter, and plays at a speed of 78 revolutions per minute (r.p.m.). Consequently, these special 16-inch recordings cannot be played on the conventional type of phonograph such as the record players which are usually included as standard equipment with program-distribution systems. In order to play

[2] A complete catalogue of all educational recordings that have been produced to date, together with brief annotations as to their content, is available at a cost of 50 cents from Miss Emily Haley, Recording Division, Association of School Film Libraries, 9 Rockefeller Plaza, New York.

the 16-inch recordings (33⅓ r.p.m.), a phonograph unit with three characteristics usually lacking in the conventional phonograph must be provided. First, the motor-turntable assembly must be capable of maintaining a constant speed of 33⅓ revolutions per minute. In actual practice, dual-speed motor-turntable units are usually employed, so that both special recordings and standard phonograph records can be played. Then, the playing head (phonographic pickup), together with the arm on which it is mounted (often incorrectly referred to as the "tone arm"), must be light enough in weight so that the total pressure at the needle point will not exceed two ounces. Finally, the pickup mounting arm must be long enough to provide a distance of at least twelve inches from the point of the playing needle to the pivot point on the mounting arm.

Since relatively few schools have phonograph equipment which meets these requirements, some teachers and school administrators may be inclined to question the wisdom of transcription-producing agencies in providing these special educational programs in the form of 16-inch recordings (33⅓ r.p.m.), rather than in the form of standard phonograph records. The explanation, of course, is that these 16-inch recordings offer three distinct advantages over standard phonograph records for most types of program content. One advantage is that where the content of any particular program is more than five minutes in length, fewer stops for changing or turning over discs are necessary in playing programs recorded on the 16-inch discs. For example, a half-hour program would occupy the two sides of one 16-inch disc, while, if it were recorded on 12-inch discs at standard phonograph speed, it would occupy both sides of each of three discs. Thus, in playing a half-hour program on the 16-inch size, but one stop for turning over the disc would be necessary, while, in playing the same program on the 12-inch size, the program would be interrupted five times for changing and turning over the discs. A second advantage is that the 16-inch recordings play with less needle scratch, due to the fact that they turn at less than half the speed of standard phonograph records. Finally, the use of the 16-inch discs makes the cost of educational recordings considerably less than would be possible if standard phonograph discs were used, since over twice as much program content is recorded on an equal amount of record-

surface area when the recording is done at a speed of 33⅓ revolutions per minute. Hence, it seems reasonable to assume that the present trend toward increasing use of the 16-inch discs (33⅓ r.p.m.) for recording educational programs is likely to be continued, and that, in the near future, all recordings of educational programs of more than five minutes in length will probably be made on the 16-inch discs.

It would seem advisable, then, for every school which has not already done so to take steps toward securing equipment for playing these special educational recordings at the earliest possible opportunity. Several types of equipment of this kind are now available. One manufacturer of program-distribution systems is known already to be including a dual-speed motor-turntable unit and lightweight phonographic pickup as standard equipment, instead of a standard phonograph unit. Other manufacturers will make this substitution on request at a slight additional cost. A number of different makes of small transcription players which can be attached to present program-distribution systems for playing these special recordings are now available on the market at prices ranging from $50 to $100. Schools also have a choice of several different makes of portable transcription players of a type which includes a dual-speed motor-turntable unit, a long-arm lightweight pickup, an amplifier, and a loud-speaker, all built into a single case. Satisfactory transcription players of this kind are available to schools at prices ranging from $75 to $150. Some of these provide a special connection which enables them to be used also to play recordings through the central program-distribution system. This type appears to be the most popular with schools which are using educational program recordings at this time.

5. Providing facilities for making recordings.—In the relatively short time that the instantaneous sound recorder has been on the market it has achieved a surprisingly wide acceptance among schools. This has been due largely to the fact that schools have found it to be readily adaptable to a wide variety of functions. For years schools have complained of the fact that many broadcasts suitable for classroom use have been offered on the air at times when it was either impossible or inconvenient for classes to hear them. Now, any school which has a sound recorder and a radio tuner can record the particular radio broadcasts it wants directly off the air, and can then play

them to class groups whenever it is convenient to do so, repeating them as often as is desired. A number of schools have built up libraries of excellent program recordings in this way. Used in conjunction with the program-distribution system, the recorder provides a means of recording any interesting talk, discussion, or student program. Some schools use the recorder as a means for enabling students to judge the correctness of their pronunciation and expression. Use of the recorder to record samples of musical or dramatic performance for later study and analysis is common in many schools, since it is much easier for students to improve the quality of their performance when they have had an opportunity to hear themselves, and to discover precisely in what respects their techniques lack effectiveness. Unquestionably, the sound recorder has so many potential applications to the total educational program of the school that any administrator, who is contemplating the purchase of program-distribution equipment, would do well to include a recorder if the school budget will permit the additional investment.

Each school administrator, however, should make sure that the recorder he selects is appropriate for performing the specific services which will be expected of it. He must decide, before making his selection, what uses are likely to be made of it, the conditions under which it will be used, and the quality of recordings which will be desired. He must also take into consideration the mechanical skill and previous experience of the person who is to be made responsible for its care and operation. To neglect these cautions may result in later dissatisfactions, since recorders differ widely according to the quality of recordings they are capable of making, the degree of skill necessary to operate them satisfactorily, and the variety of uses for which they are suited.

Recorders may be classified roughly into three general types—the home-recorder type, the semiprofessional type, and the professional type. For school use, each of these three types has certain advantages as well as certain limitations.

The home-recorder type is the lowest in price, usually costing somewhere between $50 and $150. It has another advantage in that it is so simply designed that recordings of reasonably good quality can usually be made by persons of limited technical skill. In fact, the home type of recorder bears

much the same relationship to the professional recorder that the box camera bears to the professional camera. Recorders of this type are often included as a part of a combined radio-phonograph. A number of manufacturers also produce them as separate portable units. Home recorders of the latter kind offer the further advantage of extreme portability. In case a school is interested primarily in getting a recorder which can be moved about from classroom to classroom for voice recording, or which can be taken into shops or out of doors for recording sound effects or short interviews, a recorder of this type should prove to be highly satisfactory. However, these recorders are seldom found to be satisfactory for recording radio broadcasts of more than five minutes in length. (Most machines of the home-recorder type will not record more than from three to seven and a half minutes of program content on one side of a disc.) Moreover, most of these machines lack sufficient weight to insure uniformity in recording speed, and their component parts are not machined to the precision limits which are necessary in order to give near-professional results. Consequently, schools cannot expect to make recordings of professional quality on machines of this type.

Recorders of the professional or studio type will probably have even more serious limitations for use in the great majority of schools. Machines of this type may cost anywhere from around $750 up to several thousand dollars, and are usually both too heavy and too delicate to be moved about. Precision machining and balance effectively eliminate vibration, while individual controls permit adjustment of every aspect of the recording process while the machine is in operation. The accuracy with which these controls must be adjusted, however, requires the expertness usually to be found only in an experienced "recordist." Few schools should consider a machine of this type unless a skilled operator is available.

The semiprofessional recorder, which lies between these two extremes, would seem to be the best choice for most schools, since it offers the best compromise between professional results, on the one hand, and low cost and simplicity of operation, on the other. Several makes of recorders of this type are available in the $400 to $750 price range. In general, these machines include the more essential features of the professional-type recorder, such as the 16-inch turntable, dual-speed operation,

and the choice of inside-to-outside or outside-to-inside recording, while controls have been simplified in order to reduce the number of precision adjustments which the operator must make. Hence, the semiprofessional recorder is not only applicable to a variety of uses, but it can be operated satisfactorily, after a little practice, by almost any person having a reasonable degree of mechanical aptitude. Although most machines of this general classification are claimed by their manufacturers to be portable or semiportable, it is usually inadvisable to move them about any more frequently than absolutely necessary, since any accidental jarring is likely to disturb the careful adjustments which are necessary in order to make high-quality recordings. Actually, then, they lack the ease of portability which machines of the home-recorder type offer.

In a great many schools, the recording of broadcasts off the air, to be used later for classroom listening, seems to be regarded as being one of the most important uses that schools can make of this kind of equipment. Since most machines of the home-recorder type are designed to run only at the speed of 78 revolutions per minute and will not record a disc area larger than 10 inches in diameter, it is impracticable to attempt to use such machines for recording broadcasts of more than five minutes in length. Accordingly, any school which is interested in making off-the-air recordings will find it advisable to select a recorder of the semiprofessional type. In cases where it is also considered necessary to be able to move the recorder around to the various classrooms and shops for making short recordings, it may be advisable also to buy one of the portable machines of the home-recorder type so that it will not be necessary to move the larger recorder.

It should be pointed out that many of the component parts of any recorder of the semiprofessional type must, of necessity, be fitted within limits of extreme precision, since a machine of this kind is expected to be capable of producing recordings of near-professional quality. Some of these parts are of such delicacy that careless or exploratory handling by persons unfamiliar with their operation can easily damage them or disturb the exactness of their adjustment. Consequently, it is advisable that the sole responsibility for the operation and care of a machine of the semiprofessional type be delegated to one person who has enough mechanical aptitude to understand its

operation, and who has the patience to practice conscientiously in perfecting the skills which will make him an expert recordist.

It is suggested, then, that any school which has a recorder of the semiprofessional type locate it permanently in some room which can be used regularly for recording purposes (or in a control room adjoining such a recording room), rather than in the same room where the control cabinet of the program-distribution system is located. Loud-speaker and microphone should then be run from the recorder to the central control cabinet so that off-the-air recordings can be made from the central system, and so that the recorder can be used to play 16-inch, 33⅓ r.p.m. recordings over the classroom loud-speakers.

6. Providing facilities for student broadcasting.—In installing program-distribution systems, it is a common practice to locate the central control cabinet in the school office. Since the school office is usually centrally located, placing the control cabinet in the office not only simplifies the wiring problem, but has the further advantage of placing the control cabinet where it will be most readily accessible to the school secretary or the principal. The school office will seldom be found to be a satisfactory place, however, in which to originate student broadcasts, since these broadcasts are likely either to interfere with administrative routine, or to suffer from frequent or unexpected interruptions. Hence, it is usually advisable, in installing a program-distribution system, to see that a microphone cable extending from the central control cabinet to some room which can be used regularly as a broadcasting room is provided, and that the necessary switching provisions for connecting this microphone line to the main program channel are incorporated in the design of the control cabinet.

Since many people tend to vary their distance from the microphone when broadcasting, it is usually considered necessary to be able to control the volume of a microphone at the point where it is being used. Hence, if a microphone is to be used in any room other than the one in which the central-control cabinet is located, a device for regulating its volume should be provided, either in the broadcasting room or in a control room adjoining it, so that the operator can watch both the microphone and the cast throughout the broadcast. Moreover, it is often necessary, in broadcasting dramatized programs, concerts, discussion

groups, and the like, to be able to use two or three microphones at the same time. When two or more microphones are used simultaneously, it is necessary to be able to control the volume of each one of them independently of the others. A device known commercially as a "mixer" is used to accomplish this result. Therefore, any school which expects to use its program-distribution system to any great extent for broadcasting student programs which employ casts of the size usually required for convincing dramatizations will probably find it advisable to include a mixer as a part of the central system, or, at least, to provide the microphone line to a room to be used for broadcasting, together with the necessary switching provisions, so that a mixer can be added later as soon as funds are available.

A mixer of the "speech-input console" type seems to be best suited for use by schools, since it is readily adaptable to a variety of different uses.[3] Used with headphones (or a monitor loud-speaker, if the unit is installed in a control room), a unit of this kind can be used independently of other equipment for auditions and program rehearsals. Used with a semiprofessional recorder, it provides a means of recording dramatic performances and other student programs employing large casts. Used with the program-distribution system, it provides the necessary microphone-control facilities for broadcasting student programs over the classroom loud-speakers. Finally, a speech-input type of mixer can be used for feeding programs originated in the school, over the telephone line to a local radio station, for broadcast on the air. A number of speech-input units suitable for use by schools are available on the market at prices ranging from $200 to $600. Speech-input consoles of the kind used in broadcast stations run considerably higher than this in price, but schools will find it unnecessary to consider anything so elaborate as the professional broadcast units, except in those cases where extensive programs of broadcasting are to be undertaken. Local dealers from whom the school has purchased recorders or program-distribution equipment will usually be able to suggest the best type and make of speech-input unit for any given installation. Further suggestions and recommendations may be had by consulting engineers of local radio stations. In some instances, very satisfactory speech-input units have been built

[3] The "speech-input" type of mixer must not be confused with a mixer of the "remote-control" type, since the two have different functions and operating characteristics.

by local radio servicemen to fit the needs of specific schools at costs ranging from $75 to $200.

7. Providing for individual adjustment of the volume and tone of loud-speakers.—It is not unusual to find a school equipped with a program-distribution system which reports that some of its classroom loud-speakers "sound better than others," or complains that "it is impossible to make some of the loud-speakers loud enough without having others too loud." Noticeable differences in the loudness and tone quality of classroom loud-speakers are usually attributable to any one of three conditions or to some combination of them.

Classroom loud-speakers may vary in volume because of the fact that some of them are not receiving as much electrical energy (output power) from the central program-channel amplifiers as others. This condition may be due to any one of a number of different causes, such as faulty connections, breaks in insulation, or failure, at the time of making the installation, to balance the loading of the loud-speaker lines in such a way as to direct a greater portion of electrical energy to the loud-speakers in those rooms where greater loudness is needed. In some instances, insufficient loudness may be due to a defective part or to faulty adjustment in the loud-speaker itself. Wherever difficulties of this kind are encountered, the dealer who installed the system should, of course, be consulted.

Unfavorable acoustic characteristics of classrooms give rise to two conditions which often make it difficult to reproduce programs over classroom loud-speakers satisfactorily. It is not unusual for a school to find that in certain of its classrooms students may be unable to understand programs clearly because words seem to be accompanied with a considerable amount of "fuzziness." Spoken syllables, or even entire words, may tend to repeat themselves in a confusion of echoes which make them unintelligible. This condition is largely due to the fact that the ceiling and wall surfaces tend, in these particular rooms, to reflect sounds within certain portions of the audible range in much the same manner that a beam of light would be reflected by a series of mirrors. Difficulties of this kind are encountered most often where walls and ceilings have a hard, smooth finish. The sounds which seem to undergo the greatest amount of distortion from being reflected are those of relatively high pitch.

In some classrooms, reproduction of programs over the

loud-speaker is accompanied with a disturbing "boominess" which makes listening difficult. This condition is usually due to the fact that the size and shape of the classroom happen to be such that the resonance period of the enclosed volume of air within the room tends to overemphasize tones in some portions of the audible range. Room resonance, as this condition is commonly called, is particularly noticeable with tones of lower pitch, and seems to be accentuated where the wall and ceiling surfaces have a hard, smooth finish. These conditions can usually be corrected by providing the loud-speaker with a type of tone control which can be adjusted to reduce the loudness of tones in the particular pitch ranges which are found to be most directly responsible for the difficulty. It cannot be denied that suppression of certain pitch ranges materially reduces the potential tone quality of a loud-speaker, but this sacrifice is well justified, in classrooms having poor acoustic characteristics, in view of the gain in intelligibility which it makes possible. Under extremely adverse acoustic conditions, however, it may be necessary to treat the walls and ceiling of a classroom with some kind of sound-absorbing material before a loud-speaker can be used in it satisfactorily.

It should be pointed out that both of these conditions—reflections of sound from ceiling and wall surfaces, and room resonance—vary to some extent with the number of students who happen to be in a classroom at any given time, since clothing, body surfaces, and hair all absorb sound. Hence, it sometimes happens that the loud-speaker in a given classroom will reproduce programs with complete naturalness and clarity when the number of students in the listening group is large enough to fill the room, while, with a listening group of smaller size, program-reproduction quality may be so poor as to make listening extremely difficult. Similarly, a loud-speaker which reproduces programs with sufficient loudness for a small class group may not be anywhere near loud enough when there is a large class group in the same room. This raises a problem for a great many schools where the sizes of class groups vary considerably from one semester to another, or where seasonal variations in climate result in a wide variation in the weight and texture of clothing worn. In view of the importance of being able periodically to adjust the loudness and tone of loud-speakers to meet these variations, then, it would seem

advisable that each classroom loud-speaker be provided with both a volume and a tone control. It is suggested, however, that these controls be installed in such a manner that they cannot be adjusted without the use of a special tool or key provided for this purpose, since there may be some tendency for students to tamper with the controls if they are readily accessible.

8. Extending the services of the program-distribution system beyond the school.—While the central program-distribution system is usually thought of as a device for distributing programs to student listening groups within the school building, it has a number of other potential uses which should not be overlooked. Where two school buildings are located near each other, for example, it is possible, by connecting their two central control cabinets together with a suitable transmission cable and making a few simple changes in their switching arrangements, to broadcast programs which originate in either one of the two schools over the loud-speaker system of the other. It is often possible to buy weatherproof cable suitable for this purpose from local telephone companies at scrap-length prices. Where this can be done, the total cost involved will be relatively negligible. Similarly, it is often possible to lease telephone lines for connecting the program-distribution systems of all the schools of a local system together into a "wired network" so that any school can originate programs and feed them to all of the others for distribution over their system. Where the telephone service to all the buildings of a local school system is handled from a central switchboard in the board of education offices, it may be possible to arrange with the local telephone company for these lines to be used for the distribution of interschool programs.

In a number of cities, local broadcasters make a practice of scheduling station time for school broadcasts. In most instances, it is necessary for student groups to go to the broadcast station for rehearsals and broadcasts. Since this usually involves some inconveniences, both to the school and to the station management, it may be advisable for any school which has a room that can be used satisfactorily as a studio to lease a regular program line connecting its program-distribution system (or, preferably, its speech-input mixer) with the broadcast station. Where this is done, not only can the school originate its student

programs in its own studio and transmit them, over this program line, to the broadcast station, but the broadcast station can feed its own programs, over the line, directly into the school's program-distribution system. This latter possibility is of particular importance if the school is interested in recording radio broadcasts for classroom use, since atmospheric and man-made static have little effect on the quality of program recordings when the broadcasts are fed from the station to the recorder over a line in this fashion.

It may not be practicable, because of budget limitations, to provide line connections between the several schools, or between a school and a local broadcasting station, at the time the program-distribution system is installed in any given school, but these possibilities should be kept in mind when the equipment is purchased, so that the few simple changes which would be required for these additional services can be incorporated in the design of the central-control cabinet.

PART III

Student Broadcasting

COMMON TYPES OF STUDENT BROADCASTS

In view of the frequent references that have been made to broadcasting by students over school program-distribution systems, it may be well to review briefly a few of the more common types of broadcasts of this kind.

1. Student announcements.—A great many school events, such as basketball games, student club meetings, candy sales, various drives to raise funds, plays, safety campaigns, and the like, lend themselves readily to announcement by students, inasmuch as students themselves are the chief participants in events of this kind. In general, announcements of such school events tend to be received somewhat more favorably by the student body as a whole when they are made by students than when they are made by members of the faculty.

It is usually advisable, wherever possible, to group announcements of these kinds together into a regularly scheduled announcement period, rather than to make them individually. The school announcement broadcast, however, should be carefully planned so that it will exactly fill the time allotted to it. Announcements should be crisp, to the point, and interesting. There should be no awkward pauses while the announcer tries to think what to say next. Hence, it is desirable that students learn from the beginning to speak from prepared scripts, instead of trying to speak extemporaneously.[1] All the scripts for any given announcement broadcast should be submitted, well in advance of the time for which the broadcast is scheduled, to the committee in charge of broadcasting in the school, so that whatever cuts may be required to fit the entire program into the allotted time interval can be made.

2. Student talks, special reports, and the like.—Extra-curricular activities, together with experiences growing directly out of regular class work, provide a wealth of material for interesting talks by students in the average school. The customary "pep talk" preceding a school game can be made into an effective broadcast for rallying student loyalties to the

[1] It is recommended that scripts of announcements be typed, with double spacing, in order to insure maximum legibility.

support of the home team. Talks of a somewhat more formal nature, such as those prepared in classes in public speaking, often make interesting broadcasts. Special reports that are assigned in connection with regular class work frequently provide material for broadcasts which have definite educational value for the groups which hear them.

It is suggested that the committee in charge of broadcasting within the school make a periodic canvass of the teaching staff for any reports which they have received and which appear to have sufficient interest to warrant being made into broadcasts. Here, again, as in the case of student announcements, students should be required to work from scripts.

3. Student newscasts.—Newscasting is one of the most common types of broadcasting by students in schools equipped with central program-distribution systems. In some schools, the student newscast deals wholly with events of the school and the school community, while, in others, news of national and international significance is reported. It is a rather common practice to assign the responsibility for selecting, editing, and reporting news to a group of students organized as a "radio-news editorial staff" or "radio-press club," where small committees of students, each following one particular phase of the news in which its members are especially interested, summarize the current status of each of these problems at the end of each week. Some school radio-press clubs of this kind undertake the additional responsibility of providing simplified news programs for broadcast to class groups of lower grade-levels.

It is particularly important, in news broadcasting, that scripts be written in advance, and submitted to the school broadcasting committee for approval, since newscasts should conform, in general, to a predetermined editorial policy. Obviously, then, no school newscaster should be permitted to deviate from his approved script. This is especially true in the case of news of the school and the school community, where an incorrect interpretation of some relatively insignificant incident may jeopardize the whole educational program.

4. Student interviews.—The interview broadcast offers an interesting departure from the straight talk, and is easy enough to produce to make it well suited for presentation over school program-distribution systems. Countless occasions for interview broadcasts will present themselves in the average school.

The student who won the local essay contest may be interviewed on a list of questions pertaining to the essay topic. The chief of the local fire department may be interviewed, over the school microphone, on ways of reducing fire hazards. The manager of the local building-materials company may be interviewed on a list of questions pertaining to housing conditions in the community. Broadcasts of this kind offer a convenient means of utilizing local community resources.

An effective procedure in preparing for interview broadcasts over the school program-distribution system consists in preparing a list of questions which have been raised in the discussion of a problem of current interest by a class group, inviting a member of the community who is presumed to be something of an authority on that particular problem to come to the school to be interviewed by a student representative of the class, and furnishing this person with a list of the questions he will be expected to answer, well in advance of the date of the interview broadcast. Since neither the interviewer nor the person interviewed will be speaking from script in such a broadcast, it will be necessary for the interviewer to exercise a certain amount of tact in order to keep the discussion from straying away from the topic under consideration.

5. Student-panel and round-table discussions.—Any topic about which students are genuinely concerned, and about which members of any given class group hold distinctly different opinions, can be made the subject of a student discussion-group broadcast. The chief prerequisites for an effective broadcast of this kind are that the discussion leader be chosen on the basis of familiarity with all sides of the issue to be discussed, the willingness to have all sides of the issue brought out in the discussion, and the ability to keep the discussion from straying away from the points under discussion; that the other members of the discussion group be chosen in such a way that each of the several major points of view on the issue are represented; that each member of the discussion group shall have done sufficient reading on the topic, prior to the time of the broadcast, to enable him to "document" his point of view; and that the size of the discussion group be kept within the range of the available microphone facilities of the school.

Discussion-group broadcasts tend to carry somewhat greater conviction when the members of the panel speak

extemporaneously than when they read prepared speeches. It is well, however, for each member of the panel to have a general outline of the topic of the broadcast (prepared in advance, and distributed to all members of the panel), together with a few brief notes covering data that might be used to document statements. The last few minutes of any discussion-group broadcast should usually be devoted to a summary, by the discussion leader, of the principal points of agreement and difference that have been brought out in the discussion.

6. Variety programs.—The variety program, consisting of several different presentations organized around a central theme, is a convenient type of broadcast to use for school-radio assembly programs or to use in connection with the observance of special days and holidays. Since each of its several parts can be rehearsed independently of the others, students from several different class groups can participate in the same broadcast, the presentation of each class group being rehearsed at such time as best suits its convenience. One dress rehearsal may be needed, however, in order to make sure that the several parts of the program fit smoothly together.

In a broadcast of the variety-program type, the primary responsibility for the success or failure of the program as a whole rests with the master of ceremonies (popularly referred to as the m.c. or "emcee"). Not only does he have the job of introducing the various members of the cast and tying the individual parts of the program into a continuous performance, but he must have the presence of mind to fill in any pauses in case any performer happens to miss his cue or deviate from his script. Hence, careful selection is necessary in choosing the individual who is to act as master of ceremonies for a broadcast of this kind.

While some schools have been able to obtain fairly creditable results in producing variety programs with the use of but one microphone, two or three microphones, together with some means of controlling their volume levels independently, are usually considered necessary for best results. Copies of the script of the complete program should be provided for the master of ceremonies, the program director, and the person who operates the microphone-volume controls, but other members of the cast of a variety program need have only scripts of their particular parts of the program.

7. Dramatizations.—Broadcasts involving dramatizations have gained wide popularity among schools in which program-distribution systems and recording facilities are available. Many schools are known to be producing dramatizations from scripts obtained from the script exchange of the United States Office of Education[2] while others produce their own scripts. Experiences reported by schools where student broadcasting is done would seem to indicate that dramatizations have a somewhat wider appeal, both for students who take part in the broadcasts and for those who make up the listening groups, than do other types of broadcasts.[3]

8. Recitals and concerts.—Broadcasts of this general type are relatively easy to produce. Little is required in the way of scripts beyond a list of the titles of the selections to be presented, together with whatever background information the announcer may need in introducing the characters who are to appear in the broadcast. The problem of rehearsals is considerably simplified, in view of the fact that individuals and groups that are asked to take part in broadcasts featuring glee clubs, quartets, orchestras, dramatic readings, and the like, have usually already attained some competence in their respective media of expression.

Although recitals by small groups or single individuals can be broadcast satisfactorily over a single microphone, it is usually advisable to use two or more microphones for large choral or orchestral groups, employing an input mixer to secure the correct tonal balance for the entire group.

9. Choric-speaking broadcasts.—Schools have long recognized the values of choric speaking as a form of literary expression. Teachers of literature commonly employ choric speech as a device for developing genuine appreciation of poetry. Teachers of speech and drama use choric speech as a means of providing students with a convenient medium of dramatic expression.

Choric speech is particularly effective as a broadcast technique. A verse-speaking choir can be used to advantage in dramatizations to provide the introduction and transitional

[2] A descriptive list of over 500 scripts, covering such subjects as biography, holidays and special occasions, history, literature, safety education, and the like, is give in the *Educational Radio Script Exchange Catalog.* This publication is available at a cost of ten cents from the Educational Radio Script Exchange, Federal Radio Education Committee, United States Office of Education, Washington, D. C. Scripts that are listed are loaned to schools without cost.

[3] More will be said of this type of in-school broadcast in a latter section.

passages which are required for tying the separate scenes together into a continuous story. With the addition of an appropriate musical introduction and transitions, together with a few simple sound-effects, an intensely dramatic broadcast can be built around the presentation of a poem by a verse-speaking choir. Still other applications will no doubt occur to any teacher who is familiar with the use of this speech technique.

EDUCATIONAL VALUES CLAIMED FOR BROADCASTING BY STUDENTS

The belief that production and broadcasting of student programs over program-distribution systems can be expected to assume an increasingly important rôle in formal education is supported by the values which have been claimed for it by schools in which this type of student activity has become an established practice. The more commonly claimed values tend to fall into four general classifications as follows:

1. Expression—

In the field of creative expression, it has been claimed that the broadcasting of student programs over school program-distribution systems:

a. Provides students with an additional outlet for creative expression, which combines the familiar skills and techniques of the stage with other skills and techniques unique to radio

b. Provides extended opportunities, beyond those afforded by the auditorium stage, for students to participate in the dramatic arts

c. Tends to develop, on the part of students, an appreciation of radio drama as a distinct form of art

d. Tends to develop genuine radio-program discrimination by making students conscious of the attributes which make for superior quality in any radio program

2. Service—

Definite service values have been claimed for certain types of broadcasts produced by student groups, such as:

a. Broadcasts designed specifically for use by other student groups as programs for supplementing classroom instruction

b. Broadcasts designed for use by other student groups within the school as recreational or entertainment programs

c. Broadcasts designed for interpreting the work and purposes of the school to parent organizations

3. Training—

It has been claimed that preparation and broadcasting of student programs over school program-distribution systems tends to:

a. Develop, on the part of participating students, effective style in verbal expression

b. Develop, on the part of participating students, the basic skills and understandings that are involved in radio-program production

c. Train students for participation in educational or public-service broadcasts produced over the facilities of local broadcast stations

d. Make students of listening groups somewhat more conscious of the characteristics of effective oral expression

4. Integration—

Finally, it has been claimed that preparation and broadcasting of student programs over school program-distribution systems tends to:

a. Emphasize the importance of group planning and co-operative effort

b. Create an area of student activity which combines skills and understandings developed in each of the several departments of instruction within the school

c. Provide a unifying core around which the work of extra-curricular groups related to broadcasting can be organized

SOURCES OF STUDENT-BROADCAST MOTIVATION

The initial stages of introducing student broadcasting over the school program-distribution system are likely to be accompanied by some uncertainty as to what types of broadcasts ought to be attempted. Some schools begin by producing scripts loaned to them by the Educational Radio Script Exchange of the United States Office of Education. Others begin with talks, interviews, and group discussions, leading up gradually to dramatic programs as students become more accustomed to speaking before the microphone. Still others begin by adapting short plays for presentation over the microphone. Moreover, as soon as teachers and students have attained some degree of self-confidence in producing broadcasts, it is usually found that more ideas for broadcasts will be suggested by daily experiences within the school and the immediate school community than there will be time to produce. The following twelve sources of student-broadcast motivation are listed by way of illustration.

1. Student broadcasts are often suggested by the work which some class group happens to be doing in connection with a unit of study. A member of the community, who is presumed to be something of an authority on the topic under consideration, may be invited to come to the school for an interview broadcast, or the class may prepare a dramatization by way of summing up interesting factual materials that have been collected.

2. Student broadcasts may be used as a way of summarizing the results of investigations carried out by individual students or by student committees. Investigations of this kind, done in connection either with specific aspects of a unit of study or with interesting aspects of the life of the local community, can be reported in the form of a straight talk, a panel discussion, or a dramatization.
3. Many student broadcasts grow directly out of the extra-curricular program of the school. The drama club may adapt a short play for radio. The glee club may broadcast a concert. The science club may broadcast a series of short talks on little-known scientific facts related to everyday life.
4. Student broadcasts are commonly produced as a part of the school's observance of special days or holidays. The variety-program type of broadcast is particularly effective in celebrating such special days as Hallowe'en, Thanksgiving, or Christmas, or in observing special weeks such as Fire Prevention Week.
5. Special reports and papers prepared by students in response to class assignments sometimes provide interesting materials for radio talks or dramatizations.
6. School newscasts are one of the most common types of programs presented in broadcasts by students.
7. Items of special interest in the news are sometimes developed into panel-discussion broadcasts or dramatizations as a device for getting students to think seriously about the specific problems with which these items deal.
8. Student broadcasts may be suggested by interesting experiences reported by teachers or by members of the student body.
9. Books which have aroused the general interest of particular class groups may serve as the basis for effective student dramatizations.
10. Outstanding scenes from new books are sometimes dramatized as a means of encouraging other students to read these books.
11. In some schools, broadcasts are produced over the program-distribution system for use specifically by other class groups as educational broadcasts. For example, an upper-grade group may provide story-hour broadcasts for use in the primary grades.
12. Student broadcasts are sometimes produced for the purpose of explaining significant aspects of the work of the school to parent organizations. In some cases, broadcasts of this type are produced at the time of a meeting of the local parent-teacher organization. In others, the program is produced in advance and recorded, and the transcription of the broadcast is reproduced during a parent-teacher meeting. One case is known where student-activity programs are recorded regularly each week, during the time the schools are in session. The transcriptions of these programs are then broadcast over a local radio station during evening hours, so that students can

listen, over their home receiving sets, to their own performance. This arrangement is said to offer definite advantages from the standpoint of public relations, since students usually tend to enlarge on the importance of work described in broadcasts in which they have taken part, when explaining them to their parents!

PLANNING THE PROGRAM PRODUCTION SCHEDULE

In some schools, student broadcasting is carried on in a more or less haphazard fashion. Each broadcast is produced by the particular class group with which the program idea originated, and no attempt is made toward achieving any central consistency as to program policy or production routine. In order to avoid the general confusion and overlapping of effort which usually follows under this arrangement, it is advisable, at the outset, to set up systematic procedures in relation to program production and use.

1. Determining the basis for participation.—Some schools limit the privilege of participating in program production and broadcasting to students of high scholastic ability or high achievement. Others extend the opportunity to participate as a reward for exemplary behavior. Still others, where the daily schedule is too crowded to permit the use of school time for rehearsing, find it necessary to limit participation to those students who are able to spare out-of-school time for this purpose. In contrast to these plans, some schools insist that every student in the school should, at some time or other, take an active part in broadcasting.

All four of these plans are open to some criticism. First of all, broadcasting involves a number of specialized skills which, in turn, imply specialized interests. Neither high scholastic ability nor high marks in academic subjects and general behavior constitute any dependable indices as to the various skills and interests involved in program production and broadcasting. Students who assist in the preparation of scripts must, of course, have achieved some degree of competence in written English, but, more important than this, they must have a style in oral expression which is characterized by simple sincerity and directness. Students who assist in operating the equipment used in broadcasting should know something of the scientific principles on which this equipment operates, but they must have a deftness in manipulating mechanical devices, together

with a preciseness of motor co-ordination which will enable them to act quickly and unerringly in unexpected situations. Students who participate as members of dramatic casts not only need sufficient ability in oral English and drama to enable them to interpret character parts convincingly, but they must have voices which are suited to the characters they are attempting to portray. Finally, it should be pointed out that the ideal of democracy implies the right of each individual to serve in those specific areas for which, because of his special abilities, interests, and temperament, he is especially suited—not the obligation of each individual to attempt to serve in all areas! Hence, it is recommended that students be selected for participation in program production and broadcasting on the bases of general dependability, genuine interest in this type of activity, and evident capacity to acquire the abilities which will be needed in each of the several areas involved.

2. Casting Procedures.—The selection of "talent" to take part as members of program casts is handled in a variety of ways. In schools where each broadcast is produced by a particular class group which handles all the details of production from the initial planning to the finished program, the entire class group may try out for each of the several parts, with the final choice for each part being determined on the basis of a majority decision. In schools where the details of student broadcasting are handled by a central program-production committee, it is a common practice to announce the nature of a forthcoming broadcast over the program-distribution system, describing briefly each of the several characters needed, and then to invite any students who are interested in taking part in the broadcast to come to the office or broadcasting room for auditions for the respective parts.

A somewhat different procedure, reported to be highly satisfactory, is known to be in use, with minor variations, in several school systems where student broadcasting is well established. Once or twice each semester an invitation is issued to the entire student body to report to the school broadcasting room for an audition if interested in taking part in broadcasts. Each student who reports for an audition is asked to read several different types of material over a microphone while the committee listens over a loud-speaker. A separate card is then made up for each candidate, listing his name and address, hours

he will be free for rehearsals, type of voice, rate of speaking, and the type of material interpreted most convincingly. For each production, then, the committee simply looks over these cards and selects one or two individuals who appear to be suited to each of the several parts. These individuals then try out for the several parts, and the final selection of the cast is made in terms of securing adequate voice contrast.

3. The need for considering studio limitations.—It is not advisable for a school to undertake a too-ambitious program of student broadcasting if equipment and space limitations are such that programs can be originated only in the school office. Where the only program-production facilities are located in the office, auditions, rehearsals, and even final broadcasts are sometimes delayed while the principal finishes an important "conference." On the other hand student uses of the program-distribution system often interrupt administrative routine. In some instances the final production of a carefully rehearsed broadcast may be ruined by the ringing of the telephone or by the unexpected entrance of a visitor.

Some of the newer program-distribution system installations provide microphone facilities in a room set aside especially for student broadcasting. Where a broadcasting room can be provided, existing installations can be adapted for student broadcasting by installing a preamplifier-mixer (speech input) unit in this special broadcasting room, and connecting it to the central control cabinet in the office as described previously.

While a single individual, speaking close to the microphone, can broadcast satisfactorily in almost any kind of room, room resonance and echoes are likely to make group broadcasts impossible in rooms which have no acoustic treatment. Hence, under unfavorable acoustic conditions, it is advisable to keep the size of program casts small enough so that all members can speak close to the microphone. Blankets or other soft fabric can be used temporarily to cover windows and blackboards in order to reduce room resonance, but, if the same room is to be used regularly for broadcasting, it is usually advisable to install some kind of sound-absorbing material on the ceiling and one or two of the wall surfaces. Drapes of porous material such as monk's cloth, suspended in such a way that they can be drawn over blackboards and windows during broadcasts, have been found entirely satisfactory in some cases.

4. Microphone types as a limitation in student broadcasting.—The use of inappropriate types of microphones is responsible for some production difficulties. Still others result from using microphones of inferior quality. Microphones can be classified roughly, according to pickup pattern, as directional, bidirectional, and nondirectional. Generally speaking, directional microphones are preferred for picking up talks and sound-effects that are produced in the studio; bidirectional microphones for use with small drama casts; and nondirectional microphones for use with larger groups, discussion panels, and the like. Ideally, any school that is interested in student broadcasting should have at least one microphone of each of these three types. Where funds are limited, however, one good directional microphone and one good bidirectional microphone should be put on the "must" list.

5. The need for simplicity in sound-effects.—Difficulties in student broadcasting may arise from attempting to use too elaborate sound-effects. Usually, the initial ventures in student broadcasting in any school are likely to be characterized by an over use of sound-effects. It should be remembered that, important as sound-effects are in establishing the scene and locale of the action depicted in a broadcast, their effectiveness depends largely on the verbal cues which accompany them. Thus, the crumpling of a piece of cellophane may give the illusion of a crackling fire in a fire place, a prairie fire, or the unwrapping of Christmas gifts, according to the continuity which accompanies it. Hence, it is recommended that student broadcasting groups try to keep sound-effects as simple as possible, using them to highlight action rather than to show the progression of action from one place to another. Where a portable electric phonograph or transcription player is available, it is recommended, further, that special sound-effects records, which can be ordered by any local phonograph-record dealer, be used for effects such as wind, trains, airplanes, crowd noises, automobiles, and waterfalls, which are somewhat difficult to produce realistically in the studio.

6. Determining who is to serve as the listening audience.—It is reasonable to believe that all of the class groups in any given school might profit from listening to all student broadcasts which pertain to topics of general concern and interest. Some schools make a practice of distributing most of their

student broadcasts to all classrooms, regardless of program type or content. In view of the fact that many student broadcasts are built around the immediate interests and experiences of individual class groups, there may be some question as to their suitability for general school listening. Having students listen to programs in which they have no particular interest other than that of curiosity as to how well some particular group can broadcast would seem to be hard to justify on the basis of valid use of student time.

It is probable that any student group, or the teacher of the group, which produces a program for broadcast over the school program-distribution system tends to overestimate both the importance of the program and its universality of appeal. Some schools, where students share in determining in-school broadcast policies, have noticed a tendency to limit the distribution of broadcasts of specialized appeal to a relatively small number of class groups. This would seem to confirm the belief that a certain amount of judgment should be exercised in determining the particular listening audience for any given student broadcast. It is suggested, then, that the content and emphasis of each student program be reviewed by a central committee before it is broadcast, in order to determine which class groups might derive definite values or satisfaction from hearing it.

7. Checking up on listener reaction.—Too often, teachers and school administrators judge the values of student broadcasting as a type of educational experience solely on the basis of the reactions of students who take part as members of program casts or assist with program production. While the reactions of those who participate as broadcasters are undoubtedly an important consideration, it must be admitted that the listener is the final judge as to the success or failure of any program, whether it be broadcast over a school program-distribution system or over a regular radio station. Moreover, it is important that the parents of the school community also feel assured that student broadcasting is contributing to the educational growth of their children.

It would seem advisable, then, to make some kind of check on the reactions of students to each student broadcast series. For programs whose general popularity is readily apparent, this check may be no more than a general estimate. For other programs, it may be advisable to attempt a more careful

analysis of student reactions. Frequent listener surveys often reveal criticisms which help program-production groups to improve the quality of future broadcasts. Sometimes listener reactions may indicate the need for greater variety in types of broadcasts. Above all, they will provide teachers and administrators with some indication as to whether or not the student body as a whole feels that student broadcasting is proving to be a worth-while experience. Needless to say, it is of fundamental importance that students in general feel satisfied that in-school broadcasts are contributing something to the value of school experiences, since their attitudes are reflected inevitably in the attitudes of their parents toward the school and the educational program it provides.

PART IV

A Suggested Plan for a School Radio-Drama Workshop

Student broadcasting over the school program-distribution system can consume a vast amount of the time of both teachers and students, unless there is some well-established production routine for determining general program policies, and for regularizing the details of program production, such as script-writing, casting, and rehearsing. Once a well-ordered program-production routine has been established, however, the various duties and responsibilities connected with broadcasting are distributed among several student committees, each working under one or two teachers who function principally in an advisory capacity. The essential features of organized program-production plans now in use in several schools where student broadcasting is well established are incorporated in the following outline, which is offered as a suggestive plan that may be applicable in other schools. An attempt has been made to list the several suggested committees in the chronological sequence in which they would normally be organized.

CO-ORDINATING COMMITTEE

Sooner or later, in every program of in-school broadcasting, there comes a time when some question of major importance, pertaining to program policy, administrative detail, or co-ordination of school resources, demands an immediate answer. Hence, it would seem advisable for any school that is planning to introduce this type of student activity to set up, at the outset, a central committee to handle administrative and policy-making functions.

1. Suggested membership.—In some schools, the administrative details of program planning are handled by a faculty committee. In others, these matters are handled by the student council. In still others, questions of policy and administration are handled by a committee composed of both faculty and student members. Inasmuch as matters of school policy are likely to be involved from time to time, it seems advisable that the school administration, together with the heads of at least the major departments of instruction, be represented on any such

committee. It seems equally important that the students be represented also, since, after all, in-school broadcasting is being carried on, presumably, for their benefit. Hence, it is suggested that this committee include as many student representatives as it does members of the faculty, exclusive of the chief school administrator who might be expected to serve in the capacity of chairman. It is suggested, further, that the student membership include a representative from each of the major student organizations, such as the band, the book club, the crafts club, and the editorial staff of the school paper, and that the faculty membership include the chairmen of the other radio-drama workshop committees. Where it is practicable to do so, it might also be well to include one adult representative from each of the clubs of parents in the school community.

2. Duties and responsibilities.—The major responsibilities of this committee should include planning long-range program policies, determining which aspects of school life ought to be publicized, and which ones should not, regularizing the use of the central program-distribution system in order that program-production schedules will not interfere with other uses such as class-group listening to radio broadcasts from the air, arranging for advance publicity on forthcoming radio broadcasts and student programs, checking on listener reactions to student broadcasts on the part of both the student body and the school community, and making whatever revisions in program policy or content may be suggested by these reactions. In some cases, it may be advisable for this committee to undertake the further responsibility of deciding which radio broadcasts from the air are to be used for classroom listening.

PRODUCTION COMMITTEE

Where each student broadcast is produced independently by the particular class group with which the program idea originated, there is usually a considerable amount of confusion and overlapping of effort. Some broadcasts may be produced with near-professional finesse, while others may be painfully amateurish. The criticisms with which a poor broadcast is received may be so adverse, in some instances, as to discourage a student group and its teacher from making any further attempts at broadcasting. Where all of the responsibilities connected with program production are concentrated in the

hands of a regularly constituted production committee, there is not only a greater consistency in program quality, but there is usually a steady rise in production quality as the group perfects its techniques through repeated experience. Hence, as soon as a central co-ordinating committee has reached some general agreement as to broadcast policies, the next immediate concern of the school might well be that of organizing a committee to handle the details of program production.

1. Suggested membership.—Wherever possible, it seems advisable that a teacher having some experience in drama coaching be given the directive responsibility for this committee, whether serving as its nominal chairman, or serving merely as a member. While actual radio experience would be desirable, in addition to a general familiarity with the technique of dramatic production, almost any teacher who has had some experience in coaching school plays can acquire a sufficient understanding of radio techniques to enable her to produce creditable student broadcasts, from reading some of the better books on radio production, and perhaps, observing a few broadcasts at a local radio station. Teachers of public speaking, English, and choric speaking might also be included on this committee, either as active members or as advisers. The major portion of the committee membership, however, should be made up of students who either have had some experience in school plays, or are interested in radio production.

2. Duties and responsibilities.—Members of the production committee are urged to refrain from taking parts in broadcasts, as characters in program casts, wherever it is at all possible to find others who are willing to do so, lest the student body come to feel that in-school broadcasting is the "protected privilege of a closed clique." It should always be remembered that student broadcasting over the program-distribution system is an activity which belongs to the school as a whole, and that the chief function of the production committee is that of assisting student groups and teachers in translating program ideas into effective broadcasts. Hence, this committee must view its responsibilities as those of advising, assisting, implementing, and directing. For any broadcast, its duties begin when the first draft of the program script is turned over to it, and continue, through auditioning, casting, scheduling and con-

ducting rehearsals, timing the program and making such cuts or additions as may be necessary, and end with directing the actual broadcast of the finished program.

SCRIPT-WRITING COMMITTEE

Student broadcasting over central program-distribution systems usually begins with relatively simple programs, such as announcements, talks, interviews, and discussions. Script-writing offers no particular problem for programs of these types, since continuity is customarily written by those who take part in the broadcasts, and submitted to the central co-ordinating committee for approval. Early attempts at producing dramatizations often employ scripts borrowed from the Federal Radio Script Exchange or some similar source. When any student program-producing group has had enough experience in producing the simpler types of broadcasts to give it some degree of self-assurance, it usually begins to think in terms of developing its own scripts. Familiar plays provide a ready source of material which can be adapted for radio presentation with relatively little effort. Eventually, the producing group begins to see the dramatic possibilities of the everyday school and community experiences of students as vital material for broadcasts. Hence, it is recommended that a script-writing committee be organized as early as it is practicable to do so.

1. Suggested membership.—While actual experience in writing scripts would be a definite asset, the chairman of the script-writing committee can be any teacher who has a general familiarity with dramatic style, together with some writing ability. The balance of this committee should be made up of students who are interested in dramatic writing, such as English majors, members of drama clubs, members of the editorial staff of the school paper, and the like.

2. Duties and responsibilities.— This committee should be responsible for assisting class groups and individual students in writing scripts, for collecting materials of likely value as script material, and for the writing of scripts. Excellent ideas for student broadcasts often grow directly out of class-group discussions in relation to regularly assigned school work. Where a given class group desires to prepare a broadcast of this kind, the script-writing committee should stand ready to offer its

services. Events of the local community or items of news may stimulate individual students to attempt to write scripts. Here, again, the committee should give whatever assistance it can. It should also canvass teachers regularly for any student reports which might have dramatic value. Finally, it should be responsible for writing original scripts, adapting other scripts for production over the program-distribution system, adapting plays and books for radio presentation, and for preparing copies of finished scripts for use by members of program casts.

MUSIC COMMITTEE

Many of the simpler scripts that are suitable for production over school program-distribution systems require no music, but when student program-production groups begin to feel that they have mastered some of the more fundamental techniques of production, they usually want to "dress up" their broadcasts with musical themes, introductions, and transitions. At this stage it is advisable to organize a music committee.

1. Suggested membership.—Wherever possible, a teacher who is able to make special music arrangements, and to score them for use by small orchestral and choral groups should be selected to serve as chairman of this committee. The local school-music supervisor or the director of the school band will usually be found to possess these abilities. The student members will probably be chosen from the various music groups within the school.

2. Duties and responsibilities.—The responsibilities of this committee should include selecting, arranging, and scoring music for use in school broadcasts. In the case of concerts and recitals, this committee will probably act in an advisory capacity, assisting in the arrangement of casts and the placement of microphones. Usually this committee should act as custodian of both sheet music and recordings which are collected for use in providing musical introductions and transitions. In some cases, it may be advisable, also, to include a "radio orchestra," as a part of this committee, for performing the musical passages.

TECHNICAL COMMITTEE

Some schools delegate the sole responsibility for operating the program-distribution system, together with all auxiliary equipment, to a member of either the administrative staff or

the faculty. While it is usually advisable to make one individual responsible for all the production and distribution facilities of the school, it should be pointed out that an assignment of this kind can easily occupy the entire time of any one individual. Moreover, there may be frequent occasions when several persons will be needed at the same time to operate the various program-sound devices in the school. For example, at the time one person happened to be busy with routing a broadcast from the air to classroom listening groups, or recording a broadcast for later use by listening groups, another person might be needed to operate the preamplifier-mixer (speech input) unit in the broadcasting room for a program rehearsal. Since there is a fundamental similarity among all of these program-sound devices, it will usually be found advisable to delegate the responsibility for their operation and care to a technical committee.

1. Suggested membership.—Since equipment of this general type can be damaged easily by incorrect manipulation, it is suggested that the science teacher, or some other member of the faculty who has a better-than-average amount of technical facility and understanding, be made chairman of this committee. If additional members of the faculty having the necessary skills are available, it may be well to put them on the committee as assistant chairmen. The balance of the committee, however, should be made up of students who seem to possess some natural aptitude for working with mechanical and electrical apparatus.

2. Duties and responsibilities.—It is suggested that the chairman of the committee carefully train one or two students to serve as senior technicians, making them directly responsible for operating the equipment. These senior technicians, in turn, should be made responsible for training junior technicians who will assist in maintaining the equipment in good working condition, and who will ultimately take their place after they will have been graduated. A technical committee consisting of one faculty member, two senior assistants, and two or more junior assistants will probably be sufficient to provide a staff of competent operators to meet the needs of the average school. Specific duties include tuning in radio broadcasts and routing them out over the classroom loud-speakers to listening groups, building sound-effects devices for use in dramatized programs,

taking care of microphones, cables, stands, and preamplifiers, managing portable amplifying equipment at games and the like, and managing the central control cabinet (together with the preamplifier-mixer unit, if the school has one) during auditions, rehearsals, and the final broadcasts of student programs.

Conclusion

It is probable that the great majority of teachers and school administrators will readily acknowledge the potential educational values of activities of the kinds that are described in the foregoing portion of this pamphlet. Yet there seems to be a widespread belief that such activities cannot be undertaken without leaving out something from the already overcrowded curriculum. It cannot be denied, of course, that some of the routine drill and recitation sessions of the question-answer type may have to be omitted in order to provide time for planning program production schedules, consulting source materials, writing the scripts, and for rehearsing and presenting broadcasts. However, since activities of these kinds represent problems that are of immediate and genuine concern to students, it seems reasonable to believe that their substitution for routine classroom procedures will tend to enrich the content of student experience rather than to reduce the opportunities for student growth in social skills and understandings which the school is expected to provide.

In planning the uses to be made of the program-distribution system and its associated equipment in any given school, the teaching and administrative personnel are urged to bear in mind that the mere possession of such equipment by the school provides no guaranty, in itself, that students will derive meaningful and satisfying experiences beyond those provided by the formal curriculum. Used in one way, equipment of this kind can become a highly versatile instrumentality through which interpersonal stimulation can be made to yield fundamental social skills and understandings on the part of students. On the other hand, it can be used to perpetuate the same kinds of teacher-imposed tasks which have characterized far too much of the work of the schools in the past.

It is imperative, then, that the specific uses which any given school makes of its program-distribution equipment be a

thoughtfully considered translation of its acknowledged obligations to society into concrete experiences which center around this new instrumentality of communication. As such, the entire pattern of utilization of this kind of equipment in any school must not only be consistent with its educational program, but must also be an integral part of it.

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THE EVALUATION OF SCHOOL BROADCASTS

The Evaluation of School Broadcasts is a research and service project which is seeking to discover the relationships of children and young people to radio programs, both in and out of school. In addition to analyzing the effects of programs and their value as instruments of education, the project tries to be of practical service to broadcasters in their planning and evaluation of programs, and to educators and teachers in their use of the radio and of sound recordings.

The project is sponsored by the Federal Radio Education Committee of the Federal Communications Commission and is supported by grants from the General Education Board. It operates under the Radio Division of the Bureau of Educational Research, Ohio State University. It is a five-year project started in the fall of 1937 and will be completed in 1942.

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